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The Correlation of the Use of Color Enhancements and Reading Proficiency for General Education Primary Students

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Introduction

Students experiencing difficulties with reading is not a newly discovered concept. Learning how to remediate reading difficulties is the factor that consumes many planning hours of primary teachers and parents alike. However, the purpose of this research study is to call attention to the correlation that is between color enhancements and reading proficiency. Doctor G. Reid Lyon comments in a recent article, "[Reading difficulties] compose anywhere from 80 to 90 percent of learning disabilities in general" (Weir, 2011). Facing these reading obstacles upfront is imperative to the success of these readers. When researchers, educational specialists, teachers, and parents team up to further develop the progress of struggling readers, the results can be astonishing.

The Problem: Visual Perception

The way that children perceive a written page is how they believe that all readers view the same page. However, this image may or may not be what the average reader is viewing. The visual image may be altered due to Irlen Syndrome, a brain-processing problem that causes difficulties and/or discomfort while reading. With the brain's inability to precisely process a visual image, reading can be slow, inaccurate, and inefficient. The reader, whether child or adult, may encounter one or several of the following issues: skipping lines, rereading the same line, lack comprehension of the passage, and the moving or disappearing of words on the page (Irlen Institute International, 2014).

A child that struggles with reading and comprehension is often labeled as being dyslexic or having a reading deficiency/learning disability. However, Irlen Syndrome could be the main cause. Studies have discovered that up to 46% of the population that has been diagnosed with a reading problem, dyslexia, or other learning disability may be suffering the effects of this

perceptual processing difficulty while another 12-13% of the general populace may also be affected (Uccula et. al, 2014). Irlen Syndrome is further discussed elsewhere in the study. This perceptual processing issue is causing many readers to become uninterested in becoming a successful reader due to the challenges to be overcome.

Reading Proficiency Defined

Helping children become successful readers is an essential factor in today's educational realm. This matter is what every teacher strives toward. While there is no one definition for reading, reading proficiency incorporates ones ability to decode and make meaning from words on the page both accurately and fluently. Prior knowledge of the reading is used to aid in the comprehension and decoding of the passages and the reader is able to make sense of the text to enable him or herself to learn from it. Reading proficiency require the reader to obtain and utilize skills in "language and communication, mechanics of reading, and content knowledge" (Connors-Tadros, 2014)

Color Enhancements Defined

Colors have consistently affected both young children and adults. Most find pleasure in viewing artwork, living in colorful homes, and generally appreciating the colors of the world around. These colors can cause the brain to react in multiple ways.

The Irlen Institute, along with other researchers, has taken advantage of this knowledge to create corrections for this visual processing problem. The institute's researchers have created colored filters for use while reading. These filters come in two forms: overlays and glasses. Overlays are tinted sheets lay over the selected text, book, or computer screen to create a faux colored background for the reader. Tinted glasses are for extreme cases of Irlen Syndrome that

require use all day long. These tinted overlays and glasses reduce the glare that is often reflected off plain, white paper.

Another method to incorporate color enhancements is printing on colored copy paper; worksheets to stories to anchor charts can be printed for easier viewing. This creates the same colored background as an overlay would. Both overlay and colored paper methods are used in this research study.

Research Hypotheses

The hypotheses forming the foundation this study are as follows:

1. The addition of color during reading will improve overall reading proficiency for the participants.
2. Participants will choose a single shade of color to use as their personal aid that they prefer due to comfort and possible change in visual perception.

Literature Review

Due to the importance of reading, researchers have spent years and conducted many studies attempting to devise a way to eliminate reading difficulties. A tremendous amount of studies have been created in effort to chip away a part of this growing issue (e.g., Uccula et. al, 2014). In the meantime, studies are showing that although there is no current cure, there is a way to alleviate the symptoms of some reading difficulties (Irlen Institute International, 2014).

Irlen Syndrome

Formerly known as Scotopic Sensitivity Syndrome, Irlen Syndrome treatments were discovered and developed beginning in the 1980s by Helen Irlen (Irlen, 2004). It is a visual brain-processing problem that causes discomfort and difficulties while reading. The pathway between the eyes and the brain has a glitch that makes the reading difficult due to symptoms of

Irlen Syndrome. Symptoms may include varying issues such as the print looking different, poor compression, slow or inefficient reading, and low motivation (Irlen Institute International, 2014). These symptoms are alleviated by removing harsh lighting or with the use of colored filters. The simple method of placing colored overlays over the text provides the most comfortable viewing possible for the individual. The preferred color and specific outcomes will differ from individual to individual (Boyle, 2012; Wilkins, 2001).

Methodology

Participants

The observational group consisted of six primary students attending a suburban public school in Southeastern Tennessee. The ages of the students range from 7-years to 9-years old. The ratio of participating students was four male to two female. Five out of six participants were receiving Response to Intervention's Tier 3 interventions. Students in Tier 3 receive not only whole and small group help within the classroom but also additional time (either one-on-one or small group) with an interventionist outside of the classroom. Two of the six students had been retained in the same grade for the 2014-2015 school year. Participants met weekly with the Exceptional Education Interventionist, whom collected the data, and took part in the research study.

Selected students were read the assent forms and asked if they would be willing to participant in the study. All students agreed and gave consent to be a part of the research study before information was disclosed with the researchers. An information and consent form concerning the research was also sent home prior to the disclosing of information.

Materials

The researchers provided materials for the Exceptional Education Interventionist to utilize. Twelve shades of colored paper, with approximately twenty sheets in each shade, were given to the Interventionist to use in place of white copy paper. Colors ranged from bright and bold to dull and pastel. No special worksheets or tasks were given; only the change in the color of the paper was implemented.

Colored overlays were also provided for the Interventionist to use. Nine colors were provided ranging from a subtle gray to a vivid turquoise. Each overlay has a matte side and a glossy side. One student was selected to undergo observation using the overlays.

Procedure

The measures of the research study did not alter the standard daily activities of the Exceptional Education Interventionist or the students. The only adjustment to the activities was the implementation of both colored paper and colored overlays. The Interventionist collected data over a 5-week period during the students' intervention before disclosing the information to the researchers. Over the 5-week period, the researchers visited the school once per week to confirm that the study was being successively monitored.

At the beginning of the 5-week period, the Interventionist conducted a baseline assessment with the students' sight words printed on white copy paper. The data was recorded for further use in the research study. After the baseline assessment was completed, the students were provided the opportunity to select a color of paper to be used for their sight word list that best suited their preference. The sight word lists were then printed on the chosen color for each respective student. Informal formative assessments were made weekly via observations. The data collected each week was combined to form the overall data for the week.

The student selected to use the colored overlays was observed on a one-to-one basis. This student did not receive Tier 3 intervention but showed signs of struggling to read. The student was offered the decision to opt for the color that was favored. The preferred overlay was then used while the student was reading. Reading proficiency and behaviors were carefully monitored and collected by the Exceptional Education Interventionist.

Results

Observations

Students were each assigned a number in place of a pseudonym. Students 1-5 were observed during their individual intervention times while using colored paper. Student 6 was observed outside of regular class time to provide a more focused reading time.

The Exceptional Education Interventionist assisted the researchers in choosing five major areas of potential improvement to be observed during the study for Students 1-5: Increase in focus, reduction of errors due to reversals, increase in long-term retention of words/skill, increased endurance for task, and decrease in carless mistakes. Over the course of the 5-week research study, there were perceivable changes in each student.

The introduction of colored paper affected each student, 1-5, in distinctive, individual ways. Increased the focus was the only potential improvement area that was observed in all students, 1-5. Improvement in reduction of errors due to reversals was observed with Student 1 and Student 2, whereas no improvement was observed with Student 3. Students 4 and 5 did not struggle with reversals prior to the beginning of the research so no data was available for this section. An increase in long-term retention of the word/skill was observed in Students 1-3. This retention was not seen in Students 4 and 5. Increased endurance for the task was observed in

Students 1-4, but was not seen in Student 5. A decrease in careless errors was observed in Students 1, 3, and 4. This decrease was not observed in Students 2 or 5.

Students 1 and 2 were chosen, by the Exceptional Education Interventionist, for a closer observation during the learning of sight words in intervention. These students, one male and one female, were in the same intervention group during the week. The students were each tested weekly on how many sight words that they were able to master, or identify quickly and accurately. A baseline assessment was given and the results are as follows: Student 1 was able to correctly identify 13 sight words and Student 2 was able to correctly identify 15 sight words. After the baseline assessment was administered, colored paper was immediately introduced. The sight words were printed on different colors and Students 1 and 2 chose the colors that they preferred, pink and red respectively.

After the completion of the first week while using colored paper as enhancements, the students were given a formative assessment to show their progress. Student 1 made an increase of 7 words, or 54%, for the week. Student 2 made an increase of 5 words, or 33%, for the same week.

Sight word recognition improved for both Students 1 and 2 for all five weeks of the research study. Student 1 made further weekly improvements of 1, 8, 1, and 3 words for the final four weeks respectively. The overall average of words recognized per week for Student 1 was 4.00 words and resulted in an overall increase of 154% from week one to week five. Student 2 made further weekly improvements of 3, 7, 3, and 1 word for the final four weeks respectively. The overall average of words recognized per week for Student 2 was 3.75 words and resulted in an overall increase of 127% from week one to week five.

Student 6 was observed while using colored overlays. This student was chosen on the grounds that poor reading proficiency had been noted; the student frequently rubs eyes, complains of being tired, and constantly loses place while reading. The student performs significantly below grade level and has excellent comprehension when able to focus, but is frequently distracted while reading.

At the beginning of the research study, Student 6 was given the opportunity to test all nine of the colors while reading. Three of the colors did not have an affect on the student. However, the student noticed some improvement when using the rose colored overlay. The final decision was to use the purple overlay, which caused the strongest reaction. The Exceptional Education Interventionist noticed an immediate difference in the student's ability to focus and apply decoding strategies independently without being reminded. Student 6 was able to keep place of the words without tracking with a finger. An increase of energy was also observed while the student was reading. The student consistently demonstrated the behaviors as described each time that the purple overlay was used.

Conclusion

Research Limitations

Researchers were not able to collect their own data due confidentiality of the students. The host school of the research project is over 25 miles from the researchers and the distance provided difficulties and strain for both Exceptional Education Interventionist and researchers. The researchers were able to discuss the data with the Interventionist on a weekly basis. These meetings were exceptionally brief and concise due to the daily schedule of the Interventionist.

Conducting this experiment with so few children did not give the researchers enough data to represent a significant portion of the school. The children were exposed to the color

enhancements for approximately 30 minutes, two to five times per week, under the supervision of the Exceptional Education Interventionist. The times that the children were observed was based on the pre-set, weekly schedule with the Interventionist.

These limitations should be taken into consideration when replicating the research study. An imitation study should take place at a new location to compare the results with that of this research study and widen the spectrum on knowledge on the subject matter.

Outcomes

Based on this observational research, color enhancements do have a significant impact on student learning. Both hypotheses stated by the researchers have been proved true over the course of the 5-week observation period. The addition of color did aid in reading proficiency improvement. The students also chose a single color and maintained that color throughout the study.

Many professionals have spent countless hours attempting to remediate reading difficulties. The addition of color enhancements is an affordable and straightforward strategy that has proven to have an affect on readers. All student participants were benefited by the study, each in their own techniques.

Teachers and other professionals alike should be willing to implement color enhancements into their own line of work. If the same, or closely related, results can be seen on a larger scale, giving this research study an opportunity could have lasting positive affects. All factors and results should be taken into account when seeking higher reading proficiency.

References

Boyle, C. & Divya, J. (2012). Visual-perceptual difficulties and the impact on children's learning: are teachers missing the page? *British Journal of Learning Support*, 27. Retrieved from: http://eds.b.ebscohost.com.ezproxy.southern.edu/eds/pdfviewer/pdfviewer?sid=d406f1da-5145-4f7f-8faf-ecc5376b6197%40sessionmgr112&vid=1&hid=127

Conners-Tadros, L. (2014). Definitions and appoaches to measuring reading proficiency. Center on Enhancing Early Learning Outcomes. Retrieved from http://ceelo.org/wp-content/uploads/2014/05/ceelo_fast_fact_reading_proficiency.pdf

Irlen, H. (2004). Reading by the colors. Retreived from: http://www.centerforneurodevelopment.com/files/3870462/uploaded/readingbythecolors.pdf

Irlen Institute International. (2014). Where the science of color transforms lives. Retrieved from http://www.irlen.com

Uccula, A., Enna, M., & Mulatti, C. (2014). Colors, colored overlays, and reading skills. Frontiers in Psychology, 5, 833. doi:10.3389/fpsyg.2014.00833

Weir, K. (2011). Catching reading problems early. *American Psychological Association,* 42. Retrieved from http://apa.org/monitor/2011/04/reading-problems.aspx

Wilkins, A. (2001). Intuitive overlays: instructions for use. Institute of Ophthalmology and Optomerty, 27, 166-171. doi:10.1111/1467-9604.12001

APPENDIX

Appendix A

Child Assent Form

We, Ms. Eleny and Ms. Christianna, are students at Southern Adventist University. We are doing a study to figure out if using color will help you read better. We want you to participate in the study because we want to see if we can make your reading easier for you.

For the study, your teacher may ask you some questions about how you feel about reading with color, and she may record your answers. Only people working on the study will see the data. After the study is done, we will get rid of our documents and only your teacher and the school administration will have the information.

You should know that:

- You do not have to be in the study.
- If you decide not to be in the study, you will not be in trouble. You can stop being in the study at any time.
- Your parents have been asked if you can be in this study. Even if they say it is okay for you to be in the study, you do not have to be in it.
- You can ask me questions now and if you have questions later your parents can contact us at ecarpio@southern.edu.
-

Sign this form if:

- You understand what you will be doing in this study.
- Agree to be in the study.

_____ _____

Your Signature Date

Eleny C. & Christianna W. 6 October 2014

Appendix B

Parental Permission for Participation of a Child in a Research Study Southern Adventist University

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Description of the research and your child's participation

Your child is invited to participate in a research study conducted by Eleny C. and Christianna W. Eleny and Christianna are Southern Adventist University students who are both graduating Elementary Education majors.

The purpose of this research is to discover the benefits of color enhancements on reading fluency, behaviors, and comprehension.

Your child's participation will involve no additional work on their behalf. Your child's teacher will be using colored paper and colored overlays when working with guided reading groups.

Risks and discomforts

There are no known risks associated with this research. If your child is uncomfortable with a certain color (i.e. if he/she complains of headaches or hurting eyes), the teacher will remove that given color and another will be applied.

Potential benefits

The benefits may include higher reading fluency, higher comprehension while reading, and increased positive behavior while reading. This research may help us to understand ways to better help your child become a more successful student.

Protection of confidentiality

The Daisy Elementary faculty and staff will have access to all research. The data gathered by teachers and researchers will be shared and discussed for the purpose of increasing student achievement. The data will be published on a university database in the form of a research paper. Your child's identity will not be revealed in any publication resulting from this study.

Voluntary participation

Participation in this research study is voluntary. You may refuse to allow your child to participate or withdraw your child from the study at any time. Your child will not be penalized in any way should you decide not to allow your child to participate or to withdraw your child from this study.

Contact information

If you have any questions or concerns about this study or if any problems arise, please contact Eleny C. from Southern Adventist University at (718) 208-8464. If you have any questions or concerns about your child's rights as a research participant, please contact the Southern Adventist University Institutional Review Board at (423) 236-2000.

Consent

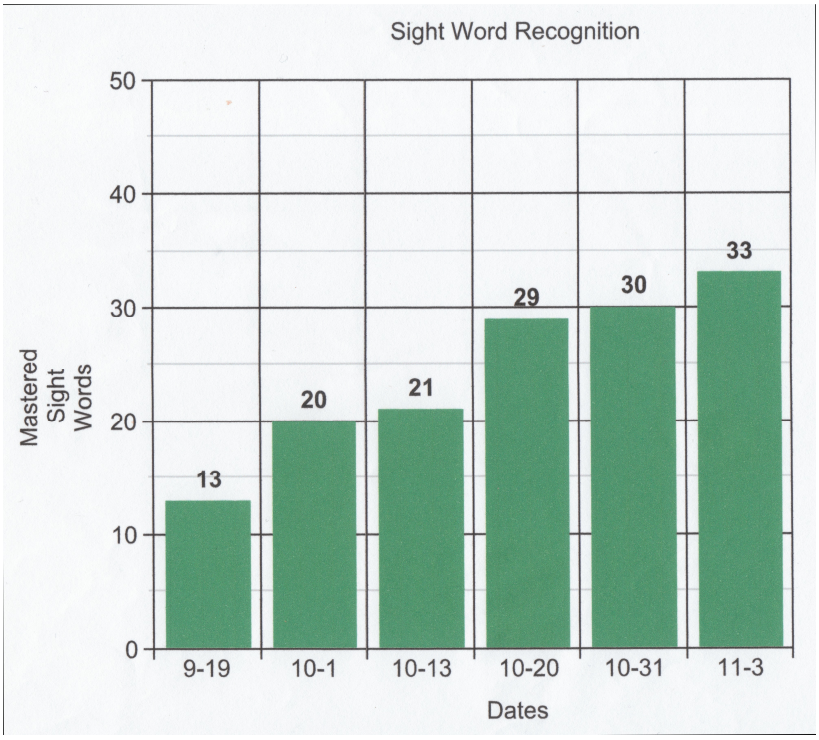
I have read this parental permission form and I give my permission for my child to participate in this study.

Parent's signature_____ Date:_____

Child's Name:_____

Appendix C

Sight Word Recognition: Student 1



Sight Word Recognition: Student 2